Configuration Identification of Project Elements, Rev. 0

OFFICIAL
Procedure

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Applicability

This procedure applies to all JPL projects and Independent Division Tasks that produce hardware, and/or computer software, which will be flown or used in support of a flight program.

Introduction

1.0 Configuration Management Overview

Configuration Management (CM) is a management discipline applied over the product life cycle to provide visibility, and to control performance, functional and physical characteristics.

- CM applies technical and administrative direction to the development, production, support, and operation of configuration items.

- CM processes facilitate orderly management of product information and product changes for such beneficial purposes as to revise capability, improve performance, reliability, extend life, reduce risk and liability, or reduce defects.

- CM processes provide for identification, change/configuration control, status reporting, and verification of the developed products (hardware, software, and documentation).

2.0 CM Resources

The CM Web Site, http://cm/ , provides resources to CM personnel and to Projects regarding the CM discipline.

- Planning Aids - The CM Planning Aids contains information relating to CM start-up activities, life cycle (both Project Management level and detailed), an Input-Controls-Output-Resources (ICOR) diagram, Planning Process Work Flow, variables affecting CM, Configuration Item (CI) selection criteria.

- Reference Library - The Reference Library contains an acronym list, a glossary, a listing of command media (standards, procedures, etc.) including links to DMIE.

- Process Work Flows - This area of the web site is divided into four parts representing the elements of CM. Each of these contains process work flows and supplementing text depicting CM activities.

- Tools - The tools section includes the CM Plan Generating Tool and the Defect, Detection and Prevention module. The former is used to develop a tailored draft Project CMP. The latter defines risk mitigation strategy related to CM practices. Other tools available to the CME include audit report formats/templates.

- Links to Other Sites - This section contains links for the CME to readily access other Institutional websites, such as PDMS and DMIE. Both internal and external links provide the CME with a variety of resources.

3.0 Configuration Identification

Configuration Identification is (1) the systematic process of selecting the product attributes, organizing associated information about the attributes, and stating the attributes. (2) a unique identifier for a product and its configuration documents. (3) the configuration management activity that encompasses selecting configuration documents; assigning and applying unique identifiers to a product, its components, and associated documents; and maintaining document revision relationships to product configuration.

Within the Identification process:

- Products are defined

- Products and documents are labeled

- Changes are managed, and

- Accountability is maintained.

4.0 Product Data Management

The success of configuration identification is dependent on the ability to manage the records and documents.

The CM process is supported by the Product Data Management System (PDMS). PDMS is a web-based application employing access control, embedded business rules and a vaulting architecture to store, retrieve, authorize and control records and associated documents. It is the Institutional repository/archive for Project generated product data.

The Configuration Identification element is enhanced by the maintenance of release records. PDMS records the electronic approval (also known as promotion) of project documents. The documents are stored (vaulted) usually in native electronic formats. In addition, PDMS provides:

- status and reporting capability.
- repository for documents and records
- automatic creation and update of the Master Controlled Document List (MCDL),
- product structures
- indentured parts listings
- means to create, store and retrieve inspection reports
- as-built data.
- verification and audit documentation

5.0 Contractor/Partner Configuration Management

The Project Manager should include a requirement for a CM discipline and CMP in contracting documents. JPL Contractors/Vendors and Team Partners are encouraged to apply their own institutional Configuration Management programs to deliverable configuration items. Project CME reviews the Contractor/Partner CM function/CMP to assure conformance. The CME may conduct a compliance audit.

6.0 Software Considerations

Software development for the Project complies with JPL D-15378, The JPL Software Development Process Description, and the supporting D-4000 series of documents. Configuration management is applied to software development

and defined in the CMP or a separate Software Configuration Management Plan (SCMP).

Steps

Step	Actor	Action
Notes		• Start during Formulation (Phase A: Mission and System Definition through Phase B: Preliminary Design) • This procedure is a continuation of the Configuration Management (CM) Procedure Configuration Management Planning for Project Elements. • Some of the steps contained herein overlap with those of other procedures and are included only to recognize the flow of project implementation.
1	**Project Management Team**	Define project documentation requirements, such as, Project Implementation Plan (PIP), Mission Assurance Plan, requirements documents, etc.
2	**Document Authors**	Identify controlled documents with JPL document numbers, titles, cover dates, and revision indicators in accordance with (IAW) the provisions of the Document and Data Control Standard (JPL-STD00010). All latest revisions of released documents shall be included on the Master Controlled Document List (MCDL). Documents are automatically entered on the MCDL when released through the Product Data Management System (PDMS). Request assignment of JPL D-numbers from Engineering Document Services (EDS) IAW Document Numbering System. Create PDMS metadata record(s) for document(s). Contact EDS at extension 4-6222.
3	**Configuration Management Engineer (CME)**	Support document authors with the creation of metadata in PDMS. Identify documents to be on the MCDL.

4	**Document Authors**	Prepare, issue, revise and retire all project controlled documentation IAW Document and Data Control Standard (JPL-STD00010). Attach draft document(s) for review and approval cycle.
5	**CME**	Use draft PIP (and other draft plans as available) to begin draft of the Configuration Management Plan, perform tailoring to meet unique project requirements.
6		Define baselines to be established to document status of the product definition at key points in the product life cycle as depicted on the Project/Task Master Schedule. Baselines also serve as a point of departure to manage changes. Examples: • Preliminary Requirements Baseline, to be established at the end of Phase A corresponding to the commitment to the preliminary Level 1, 2 and 3 requirements and draft Level 4 requirements. • Requirements Baseline, to be established at or as a result of the Preliminary Design Review (PDR) (start of Phase C: Detailed Design and transition to Implementation) corresponding to the commitment to the final Level 1, 2 and 3 requirements and preliminary Level 4 requirements. By PDR, all mission level and interface requirements are identified and subject to formal change control practices. • Design Baseline, to be established at or as a result of the Critical Design Review (CDR) (start of Phase D: Build and Test). The CDR is conducted to ensure that all the requirements have been identified, that the released detail design documentation will correctly implement the mission requirements, and to demonstrate the maturity of the design and readiness to

		build the product. Formal change control practices are implemented for detailed designs. • Product Baseline, to be established prior to Assemble, Test, Launch Operations (ATLO) as a result of audits and certification reviews (refer to Procedure for Configuration Verification/ Auditing of Project Elements (DMIE 54396). Product baseline is maintained throughout the remainder of the program via change control. For each equipment list item the product baseline shall be established by the conduct and closure of the Functional and Physical Configuration Audit, and is defined by the End-Item Data Package (EIDP). For assembly levels above the equipment list items, a product baseline shall be established via higher level audits. (The operational baseline is maintained by formal change control of the product baseline.) Note that the above baselines may be applied to the entire project as a whole, or to individual Configuration Items (CI).
7	**Project System Engineer (PSE)**	Initiate requirements definition and traceablility.
8		Define interface requirements. The system/subsystem interfaces, external and internal, shall be represented by interface control documents and subject to change control. • Establish requirements for Interface Control Documents (ICD) which shall be required to ensure equipment and software design compatibility with externally provided elements. • Identify Interface Control Working Group (ICWG) Membership (JPL, subcontractor, team partners). The ICWG

		identifies all ICDs required to ensure interface compatibility among individual elements of the system. System Engineering chairs the ICWG with participation from appropriate Project Elements Managers (PEM) or Cognizant Engineers (CogE) whose products may be impacted by the interfaces. ICWG is a technical body only and does not authorize or approve changes. However, the ICWG does provide impact assessments and recommendations to the CCB for incorporating proposed changes to different hardware and software elements of the system. Obtain appropriate numbering for ICDs (JPL D-number from EDS or drawing numbers from Engineering Data Management Group (EDMG).)
9		Create PDMS metadata for ICDs, attach draft documents when appropriate for review/check/approval cycle.
10		Create Project Master Equipment List (PMEL): • items to be detached from spacecraft or higher assemblies in the Spacecraft Assembly Facility (SAF) • items individually deliverable to SAF • items environmentally tested as separate units • items delivered to another division or subsystem for subsequent assembly and delivery to SAF.
11		Coordinate with PDMS for non-ANSI part of Reference Designator.
12	**CME**	Obtain PMEL from PSE. Coordinate/Input PMEL to PDMS IAW Engineering Data Management, Product Data Management System Manual (JPL STD-00007), and Design Configuration Listing (IPL and

		Related Lists) - EP505803.
13	**Lead Designer**	Request a block of drawing numbers for project use. Hardware drawing and part numbers shall be obtained through EDMG, Flight Projects call extension 4-2486 and Telecommunications and Mission Operations Directorate (TMOD) call extension 4-8381.
14	**EDMG**	Allocate (by PDMS entry) a block of drawing numbers IAW Numbering of Engineering Documents JPL-STD00003.
15	**Lead Designer**	Use PDMS to assign drawing numbers to designers.
16	**Flight System Manager**	Define specification requirements (equipment, procurement).
17	**Document Author(s)**	Create specifications IAW Eng. Std. Prep. of Hardware Specifications JPL-STD-00002 (D-4410), numbered and coded IAW Numbering of Engineering Documents JPL-STD00003, and Coding of Engineering Documents JPL-STD00006. Obtain appropriate document numbers from EDS or EDMG. Create PDMS metadata record(s) for document(s). Attach draft document(s) for review and approval cycle.
18	**Software Development Manager**	Coordinate with CME to develop software (SW) identification schema IAW The JPL Software Development Process Description. Software requirements documents, interface requirements, software detail design, build instructions, test requirements, user manuals and operating guides shall each be uniquely identified. Label software versions to clearly identify the modules, components, and frameworks for both function and version, and to relate them to the appropriate documentation. Create PDMS metadata record(s) for document(s). Attach draft document(s) for review and approval cycle.
19	**Designers**	Prepare engineering drawings IAW the requirements of the Drafting Manual JPL-

		STD00001, and JPL Engineering Drawing Practices Summary. Update PDMS metadata.
20		Apply JPL and ANSI reference designators to drawings to identify parts to the lowest level.
21	**CogE**	Initiate release processing IAW Document Release System (EP500550), and Document Release Notice (DRN).
22	**Designers**	Attach drawing files to PDMS record prior to review/check cycle, coordinate with EDS/EDMG as to appropriate record file type.
23	**EDMG or project personnel**	Provide check print distribution and signature sign-off. (During planning, a decision was made and funding allocated to perform this task.)
24	**PDMS**	Notify reviewers that documents ready for review/check.
25	**Reviewers**	Sign off drawing electronically in PDMS.
26	**CogE**	Approve the drawing(s) electronically in PDMS.
27	**EDMG**	Promote (release) drawing based on DRN, etc.
28	**EDMG or project personnel**	Create and maintain product structure, equipment list and drawing tree for project. (During planning, a decision was made and funding allocated to perform this task.)
29	**EDMG**	Engineering documentation being sent to or received from a contractor shall be processed IAW Document Release Notice (DRN), Engineering Document Transmittal, Engineering Procedure for(EP505808), and coordinated with CogE and contract negotiator. Transfer of design authority (control) of drawings shall require a change of the drawing Commercial And Government Entity (CAGE) Code via drawing revision.
Note		CDR for each CI represents the transition from Phase C – Detailed Design to Phase D Build and Test.
30	**CogE**	At the completion of CDR for each CI

		(PMEL item) coordinate with the design team to incorporate required changes resulting from the CDR.
31		Coordinate with the CME and EDMG to establish the Design Baseline (referred to as the "As-Designed" or documentation baseline in EP505803). At this point formal change control is required.
32	**EDMG**	Create Indentured Parts List (IPL) and Data List (DL) IAW Design Configuration Listing (IPL and Related Lists) - EP505803.
33	**EDMG or project personnel**	Create Electrical and Mechanical Parts Lists, Kit Lists and other associated lists. (During planning, a decision was made and funding allocated to perform this task.)
34	**CME**	Manage changes IAW CM Procedure for Configuration/ Change Management of Project Elements, DMIE 54394.
35		Manage status accounting requirements IAW CM Procedure for Configuration Status Accounting for Project Elements, DMIE 54395.
36		Maintain MCDL IAW Updating MCDL Lists.
37	**Assembly and Manufacturing Functions, and Contractors**	Establish traceability of CIs and for any item that must be traced individually. PMEL items, items that are individually tested, and items having a configuration document are serialized. Reference designators are used to locate electrical and electronic parts, subassemblies, assemblies and subsystems within systems, enabling traceability to installation locations. Part numbers, serial numbers, and lot date codes provide pedigree data enabling traceability to the manufacturers or other sources. Complete traceability is provided through PDMS.
38	**Quality Assurance**	Record traceability data on Inspection Report (IR) and Assembly and Inspection Data Sheet (AIDS) IAW the appropriate Quality Assurance Procedures.
39	**EDMG**	Create Consolidated Indentured Parts List (CIPL) by extracting traceability data (e.g.,

		serial numbers, lot numbers, date codes, as appropriate) for entry into PDMS IAW Engineering Data Management, Product Data Management System Manual (JPL STD-00007), Design Configuration Listing (IPL and Related Lists) - EP505803, and Hardware Documentation AS BUILT (FS503624).
40	**CogE**	Prepare additional engineering documentation, such as analysis, test plans and procedures and test reports IAW the requirements stated above. They shall be numbered, approved, and subject the change control.
41	**CME**	Perform Verification and Auditing IAW CM Procedure for Configuration Verification and Auditing of Project Elements, DMIE 54396. This includes auditing of supplier/partner compliance, performing and documenting of independent incremental audits during product development, supporting of design and certification reviews.
42		Review/Approve Partner/Contractor CMP.
43		Monitor Partner/Contractor CM performance, conduct compliance audit(s) as necessary.
44		Monitor Project performance, maintain and update CMP as appropriate.
45	**CM Manager or delegate**	Monitor Project CM/CME, conduct compliance audit(s) as appropriate.
46	**CME/CM Manager**	At the conclusion of the mission, assure that appropriate records are archived.

[Double-click **here** to add ***Steps***]

Controlled Records

Master Controlled Document List(s) including documents contained thereon and drawings.

Project Master Equipment List(s)

Indentured Parts List(s)

Consolidated Indentured Parts List(s)

Data List(s)

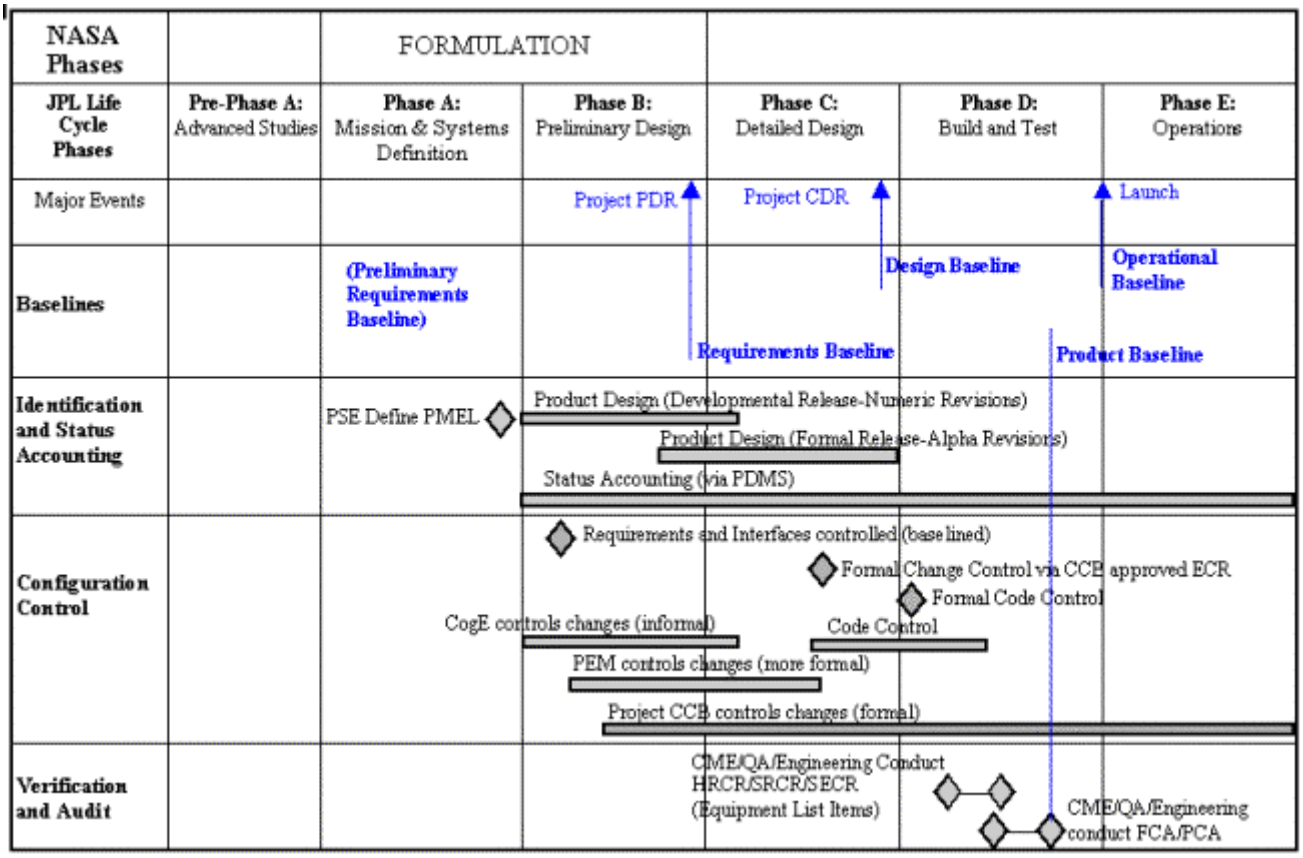
Consequences

Failure to execute the requirements of this procedure could result in products that do not meet the expectations and requirements of JPL's customers.

Rationale

To assure that the product and engineering data properly reflects the requirements and authorized changes set by the customer and regulatory agencies, and that the product meets the needs and expectations of the customer.

Exhibits



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